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L2: Entry 36 of 60

File: USPT

Jul 22, 1997

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DOCUMENT-IDENTIFIER: US 5650217 A

TITLE: Tactile image enhancer

Abstract Text (1):

A sheet material is capable of converting a two dimensional image which may be of interest to a visually handicapped individual, into a three dimensional raised image that can be perceived by the visually handicapped individual using the individual's tactile sense. The method, apparatus and material uses a sheet-like substrate which is coated throughout its entire area by an expandable composition. A two dimensional, initially flat, image can be drawn, imprinted or otherwise placed on the substrate using a dark, dense color which is preferably black. The black color of the image absorbs energy to a greater extent than the surrounding substrate so that when the substrate is irradiated, for example, using an infrared lamp in an enclosure through which the sheet of material passes, the image becomes puffed and raised. The visually handicapped individual can then touch the surface of the substrate and easily perceive the raised image. This opens an entire new class of images to the visually handicapped individual since using the invention, a wide variety of mechanisms can be used to place black images onto the substrate of the invention, and then the substrate is heated using the apparatus of the invention to raise the image and allow the handicapped individual to "view" in the tactile sense, art work, architecture, musical notes, maps, sketches, images and any other class of shapes which are normally perceivable only by a sighted individual.

Brief Summary Text (2):

The present invention relates in general to equipment and techniques for helping the visually impaired and blind, collectively referred to herein as visually handicapped individuals, and in particular to a new and useful method, apparatus and substrate which, together and separately, can be used to produce three dimensional images from initially flat images, which can thus be perceived by the visually handicapped individual, using the individual's sense of touch.

Brief Summary Text (3):

The use of touch by visually handicapped individuals is well established. For example there are currently four commonly used types of Braille text, which utilizes unique patterns of dots to designate numbers, letters, etc.

Brief Summary Text (4):

It is also known that visually handicapped individuals can perceive normal print, if it is raised and if it is generally of a size larger than 24 pt, and regular rather than bold print.

Brief Summary Text (6):

There is currently no mechanism, technique, equipment, substrate or apparatus, which is available that is sufficiently versatile, cheap and quick to utilize, and which would allow a visually handicapped individual to raise any image of his or her choice, including not only alphanumeric characters, but also any variety of symbols, drawings, paintings, sketches, maps, plans, layouts and any other visually perceptible two dimensional image.

Brief Summary Text (8):

An object of the present invention is to provide a technique, equipment and materials which allow for the creation of any two dimensional image, followed by the raising of that image so that it can be a tactile image, perceptible by a visually handicapped individual.

Brief Summary Text (9):

One important application of the invention is the generation of maps, plans, layouts, etc. so that a visually impaired or blind person can have one on their computer that shows the path of a fire exit in a building, for example. The layout could be the plan of the office space. The computer can generate a regular two dimensional image onto a specially coated substrate of the invention, which is then put into a puffing device of the invention and automatically the visually impaired person has a tactile readable map which he or she can follow.

Brief Summary Text (12):

Another application of the invention is for art appreciation, where a famous painting is reduced by a hand tracing to its different shapes, elements, textures, etc., provided into each of these shapes and then this image can be puffed to provide the visually handicapped person with a tactile equivalent to the painting to help them appreciate the painting.

Brief Summary Text (13):

Another application is for ATM machines. There are six different common layouts for ATM machines. The visually handicapped person can be provided with six different layouts so they are prepared for all of them, with the instructions in Braille, so they can go into an ATM machine by themselves without help and with maximum security, since they do not have to give out their secret pin-number to use the machine. The technique can be expanded to calendars and games for learning. An application for children in particular is an ABC chart where the sighted child would normally repeat the letters of the alphabet several different times. The chart itself can be raised so that the visually handicapped child can feel where the letters should go, write the letters onto the page and then return the page to the machine for puffing the handwriting so that the child has immediate feedback on how well it did in reproducing the letters.

Brief Summary Text (16):

The combination of being able to raise any conventional types or printed page or computer generated page or handwriting, as long as the lines are dense and dark enough, makes the invention broadly applicable for many different classes of visually handicapped persons and also aesthetic value for people who can see if they want to accent their future or preexisting writings with raised images. For example, advertisements can be given a 3-D look using the invention.

Brief Summary Text (17):

A further object of the present invention is to provide a method for allowing a visually handicapped individual to appreciate any two dimensional image. A further object is to provide an apparatus comprising a machine and specially constructed substrate, which can be used together for raising any two dimensional image into a three dimensional image. A further object of the present invention is to provide a specially formulated substrate, advantageously in the form of a coated substrate, on which any energy absorbing image which can be used in conjunction with a suitable energy source (such as IR, RF, microwave, etc.) to generate heat and thereby raise the image. A substrate coated with the expandable coating of this invention may be coated on the back with a pressure sensitive or other type of adhesive so that it may be readily applied to other surfaces to create signs and the like. Also, the coating may be applied to many three dimensional and/or bulky, and/or difficult to move or manipulate objects, marked with a dark color (which absorbs infrared and converts it to heat) by use of any convenient marking instrument, and expanded with a hand-held infrared source. Possible examples are

plaques, walls, furniture, machines, appliances, etc.

Detailed Description Text (15):

The importance of being able to crumple and/or fold the sheets without leaving permanent creases became clear when tactily enhanced sheets made from certain types of nonwoven substrates according to the invention, were actually used by visually handicapped persons. Whereas a sighted person has little difficulty in refolding a map or other document along its original fold lines, the task is much more difficult for those who can not easily see the location and direction of the original folds. Sheets which can be crumpled up, without regard to the original fold lines, pocketed, and reopened for use without reducing the "readability" of the tactily enhanced images, are much more useful to the visually handicapped than are those which retain creases when crumpled.

Detailed Description Text (93):

Referring to FIG. 7, an example of use of the invention is illustrated. The invention can be applied to any object, whether flat or three-dimensional, such as a door 100, which is given by way of example only. The object may have a surface, such as an upper panel 110, which is either directly coated with the expandable composition of the invention, or to which a substrate 112, coated with the expandable composition is adhered. An image which is darker than the remainder of the substrate, such as the pattern of letters spelling "EXIT" are applied (using any process) to the surface of the coated substrate 112 or the expandable coating on the object 100. This is shown at 114. Using any portable source of heat or irradiation such as a simple heating lamp generally designated 120, the substrate 112 is heated, with the darker image 114 being heated to a higher temperature because of its higher absorption characteristic, than the remainder of the substrate 112; thus expanding or puffing the image. In the example of FIG. 7, a tactile image which can be read by a visually handicapped person is thus cheaply and easily applied to an exit doorway.

CLAIMS:

1. A sheet material for use in making a raised image, so that it can be perceived by a visually handicapped individual using the tactile sense, comprising:

a substrate having a color which absorbs radiated energy to a first, low extent, the substrate being impervious to heat within a selected elevated temperature range, the substrate being nonwoven and made at least one of polyester, polypropylene, polyolefin and polyamide and at least some cellulose;

a coating of dry expandable composition coated over substantially all of the area of the substrate, the expandable material being expandable when exposed to the elevated temperature range, the expandable composition containing an expandable component comprising expandable microspheres, and a matrix material for containing the microspheres and forming a raised film when the microspheres expand; and

an image which is of interest to a visually handicapped individual, applied to the substrate, the image having a dark, dense color which absorbs radiated energy to a second, high extent which is greater than the first, low extent, so that when the substrate is exposed to radiated energy for reaching the elevated temperature range, the expandable microspheres expand only in the two dimensional image to raise the two dimensional image, and not elsewhere on the substrate, so that the image can be perceived by the visually handicapped individual using the tactile sense.

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